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Maximum Drawdown and the Allocation to Real Estate

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Abstract:
We investigate the role of real estate in a mixed-asset portfolio when the maximum drawdown (hereafter MaxDD), rather than the standard deviation, is used as the measure of risk. In particular, we analyse whether the discrepancy between the optimal allocation to real estate and the actual allocation by institutional investors is less when a Return/MaxDD framework is used. The empirical analysis is conducted from the perspective of a Swiss investor using international data for the period 1979-2002. We show that most portfolios optimised in Return/MaxDD space, rather than in Return/Standard Deviation space, yield a much lower MaxDD, while only a slightly higher standard deviation (for the same level of return). The reduction in MaxDD is highest for portfolios situated half-way on the efficient frontier, typically close to those held by pension funds. Also, the reported weights for real estate are much more in line with the actual weights to real estate by institutional investors.

Executive Summary:
The positive role of real estate in diversifying mixed-asset portfolios has been well documented in the literature. It is common knowledge for instance that real estate returns are lowly (positively or negatively) correlated to those of stocks and bonds. Several studies have suggested that the optimal weight that should be allocated to real estate in mixed-asset portfolios is in the 15-30% range. Institutional investors allocate, however, a substantially lower weight to real estate than

that reported in the literature. Several studies have attempted to provide explanations for this discrepancy. It has been argued for instance that the weight which should be allocated to real estate is much more in line with the actual institutional weight when an asset- liability framework is used rather than an asset only framework, or when real estate market imperfections are considered. Some authors also stress that weights are reported with error, and hence that caution should be exercised when implementing a diversification strategy as the confidence bounds around the efficient frontier allocations are very broad. Yet an alternative approach to addressing the issue of errors in parameters is to use Bayes-Stein estimators. As most of the errors in parameters concern the expected means, the idea is to shrink the sample averages toward a common mean. By so doing, the calculated portfolio allocations have been shown to be more stable than when classical mean-variance analysis is used.

We follow another route in trying to reconcile the optimal and effective allocations to real estate in mixed-asset portfolios. We maintain that standard deviation is not necessarily the unique measure that should be used to ascertain the riskiness of assets when cons tructing efficient portfolios. An alternative measure of risk is the maximum drawdown (hereafter MaxDD) which measures the loss from a local maximum to the next local minimum. This measure is intuitively appealing in that institutional investors for instance should be concerned with the maximum loss on the various asset classes. The traditional mean-variance framework can easily be adapted to a mean-MaxDD framework, and the optimal weight which should be allocated to the various asset classes can be determined.

The aim of this paper is to ascertain the role of real estate in diversifying mixed-asset portfolios when a MaxDD framework is considered. The empirical analysis is conducted from the perspective of Swiss pension funds and pertains to the period 1979-2002. We consider the various asset classes that are considered by these investors, i.e. Swiss and foreign stocks and bonds, Swiss and foreign indirect real estate, and Swiss and foreign direct real estate investments. The overseas direct investments are proxied by means of the U.S. and U.K. direct real estate indices. The constraints on investments in the various asset classes that apply to Swiss pension funds are taken into account in the analysis. Even though these constraints are not compulsory for all investors, they should be fairly representative of the investment policy by Swiss pension funds.

Our results suggest that most portfolios optimized in return-MaxDD space yield a much lower MaxDD than when a traditional mean-variance framework is used, and that such portfolios only exhibit a slightly higher standard deviation. Hence, using such a framework appears to enhance the MaxDD quite a bit, while the losses in terms of standard deviation are only limited. The optimal allocations to real estate using a MaxDD framework are much more inline with the actual allocations by institutional investors. This is an interesting finding: from that perspective, the real

estate holdings of institutions appear not to be that inefficient. This is not to suggest that institutional investors necessarily use a MaxDD framework when allocating funds across asset classes, but only that their investment policy is not that inefficient when considered from the perspective of the MaxDD.